

PATENT ABSTRACTS OF JAPAN

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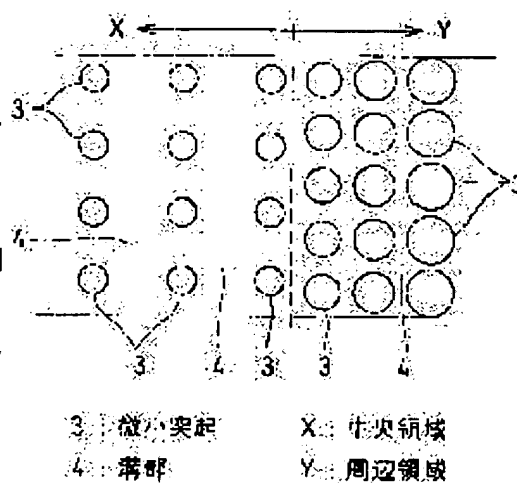
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(54) RESIN RELIEF PRINTING PLATE FOR FORMING THIN FILM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a resin relief printing plate for forming a thin film by which a marginal phenomenon is prevented from being generated and an oriented film with a uniform film thickness can be formed.

SOLUTION: In the resin relief printing plate for forming the thin film used for transferring a coating liquid applied on projected parts 2 for printing onto a body to be printed and printing, channel parts 4 for holding the coating liquid are formed among adjoining micro-projections 3 by distributing and forming a number of the micro-projections 3 on the whole face of the projected parts 2 for printing. In addition, in the central regions X of the projected parts 2 for printing, the adjoining micro-projections 3 are uniformly formed and in the peripheral regions Y of the projected parts 2 for printing, distribution densities of the micro-projections 3 are higher than those of the central regions X. In addition, the occupied area ratio of the micro-projections 3 becomes gradually higher as the regions approach toward the end parts in the peripheral regions Y.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the plastic plate for thin film formation which can form the orientation film of uniform thickness on the electrode forming face of the substrate for liquid crystal display components.

[0002]

[Description of the Prior Art] The plastic plate is conventionally used for various printings. Especially, in recent years, in case a liquid crystal display is produced, in order to print the orientation film which forms an orientation layer, the typographic printing method which used the plastic plate is used. In order to specifically carry out printing formation of the orientation film which becomes a glass substrate front face from polyimide resin, the plastic plate which used the photo-setting resin and was produced is used widely. And two glass substrates with which printing formation of the orientation film which consists of polyimide resin was carried out are prepared using the above-mentioned plastic plate, as the orientation film made of polyimide resin counters, a laminating is carried out, the closure of the liquid crystal is carried out to the gap of the above-mentioned orientation film made of polyimide resin, and a liquid crystal display is produced.

[0003] Printing formation of the orientation film which comes to use the above-mentioned plastic plate is carried out by, for example, going via the following processes. First, the plastic plate by which the slot for holding a uniform quantity of coating liquid was formed in the whole heights front face for printing is prepared. The above-mentioned slot is formed by preparing the minute projection of uniform magnitude and distribution density in the above-mentioned heights front face for printing. And after applying the coating liquid of polyimide resin to this whole heights front face for printing and making coating liquid hold on the above-mentioned heights front face for printing, this coating liquid is imprinted to a glass substrate. And the orientation film made of the polyimide resin of the magnitude corresponding to the heights front face for printing is formed on a glass substrate by making it dry, and removing and calcinating a solvent after an imprint.

[0004] Thus, it is required for the above-mentioned glass substrate that the orientation film made of polyimide resin by which printing formation is carried out should be uniform thickness. That is, recently, in order to realize gradation display with a more expensive liquid crystal display, and high contrast, very high homogeneity is demanded about the orientation film itself, and if the thickness of the above-mentioned orientation film made of polyimide resin is also change of thickness that it is not uniform and slight, the problem that change of a poor gap and threshold voltage and the irregular color of a foreground color occur will arise.

[0005]

[Problem(s) to be Solved by the Invention] However, compared with the central field, as for the orientation film made of polyimide resin in which printing formation was carried out by the plastic plate which has in homogeneity the minute projection by which distribution formation was carried out as mentioned above at the heights for printing, the phenomenon in which the thickness of a boundary

region became thick had occurred. This is based on the following reasons. A printing machine printing cylinder (drum) front face is equipped with the above-mentioned plastic plate, and coating liquid is usually supplied to this. Namely, in order [a predetermined rotational speed and in order to push and to imprint coating liquid to a glass substrate by **], According to rotation of a printing machine printing cylinder, the coating liquid which is piling up in the heights central part for printing of a plastic plate in the periphery section An assembly, The phenomenon in which the thickness of the periphery section of the orientation film which coating volume increases in the periphery section, and a liquid reservoir is generated, consequently is obtained becomes thick arises (henceforth a "MAJINARU phenomenon"). For example, the orientation film which should be formed so that it may become the thickness of 300-900A is thickly formed in about 1200-1800A in the periphery section. Although various approaches, such as amelioration of the printing machine by regulating [of the design device and printing stage scan speed of a pattern configuration of the heights for printing, or coating liquid concentration] automatically etc., are tried from the former in order to cancel such fault, the actual condition is not yet solved.

[0006] It is made in view of such a situation, generating of a MAJINARU phenomenon is controlled, and this invention sets offer of the plastic plate for thin film formation which can form the orientation film of uniform thickness equal to a central part also in the heights periphery section for printing as the purpose.

[0007]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the plastic plate for thin film formation of this invention By being the plastic plate for thin film formation used in order to imprint and print the coating liquid applied to the heights for printing to a printing hand-ed, and carrying out distribution formation of much minute projections all over [above-mentioned / for printing] heights Between adjacent minute projections, the slot for holding the above-mentioned coating liquid is formed. The central field of the above-mentioned heights for printing An adjacent minute projection is formed at equal intervals, and the boundary region of the above-mentioned heights for printing takes the configuration of being formed so that the rate of occupancy area of a minute projection may become high gradually as it goes to the edge in a boundary region, while the distribution density of a minute projection is formed more highly than a central field.

[0008] That is, this invention persons controlled generating of a MAJINARU phenomenon, and in order to obtain the plastic plate from which formation of the orientation film of uniform thickness is attained, they repeated a series of researches. And it ascertained that it is what is depended on a reason which was explained previously as a result of repeating research about the cause by which a MAJINARU phenomenon occurs, first, and research was further repeated centering on the minute projection pattern of the heights for printing of the plastic plate which can control the liquid reservoir of coating liquid in the periphery section. While the central field of the above-mentioned heights for printing forms an adjacent minute projection at equal intervals, consequently, the boundary region of the above-mentioned heights for printing If it forms so that the rate of occupancy area of a minute projection may become high gradually as the distribution density of a minute projection forms more highly than a central field and moreover goes to the edge in a boundary region Generating of a MAJINARU phenomenon was controlled and header this invention was reached [that the orientation film of uniform thickness comes to be obtained, and].

[0009] and -- printing -- ** -- heights -- a boundary region -- minute -- a projection -- distribution density -- (-- Y --) -- printing -- ** -- heights -- a center -- a field -- minute -- a projection -- distribution density -- (-- X --) -- a ratio -- [-- (-- Y --) -- / -- (-- X --) --] -- specification -- the range -- setting up -- if -- more -- much more -- generating of a MAJINARU phenomenon -- controlling -- the orientation film of uniform thickness -- it can form -- coming .

[0010] Moreover, form a minute projection the shape of a truncated cone, and in the shape of a cylinder, and receive the diameter of a projection of a minute projection of the central field of the heights for printing. if it sets up so that the diameter of a projection of the minute projection near the central field and the diameter of a projection of the minute projection by the side of the edge of a boundary region

may be alike, respectively, the diameter of a projection of a minute projection of the boundary region of the heights for printing may receive and it may become a specific ratio. Generating of a MAJINARU phenomenon can be controlled further and the orientation film of uniform thickness can be formed now. [0011]

[Embodiment of the Invention] Below, the gestalt of operation of this invention is explained in detail.

[0012] An example of the plastic plate for thin film formation of this invention is explained. The plastic plate 1 whole has the shape of a square, as shown in drawing 1, and the heights 2 for printing are formed in the center. And as shown in drawing 2 and drawing 3, distribution formation of much minute projections 3 is carried out all over [above-mentioned / for printing] heights 2, and the slot 4 for holding the coating liquid which forms the orientation film between this adjacent minute projection 3 is formed. The minute projection 3 which the central field X of the above-mentioned heights 2 for printing adjoins is formed at equal intervals. On the other hand, the boundary region Y of the above-mentioned heights 2 for printing is formed so that the rate of occupancy area of the minute projection 3 may become high gradually, as it goes to the edge in a boundary region Y, while the distribution density of the minute projection 3 is formed more highly than the central field X. In addition, the rate of occupancy area of this minute projection 3 means the rate that the minute projection 3 to a gross area with the slot 4 formed of during the minute projection 3, and the minute account adjacent projection 3 of a top occupies.

[0013] The plastic plate 1 for thin film formation of this invention is the same as that of the conventional thing also in any, such as the configuration, an ingredient, and operation. That is, the basic configuration of this plastic plate 1 consists of heights 2 for printing formed by stiffening a photo-setting resin, and non-printed section 2a which supports these heights 2 for printing. And coating liquid is applied to this heights 2 front face for printing, and coating liquid is imprinted and printed by the printing hand-ed.

[0014] Although the flat-surface configuration of the above-mentioned heights 2 for printing is determined suitably, generally the thing of an abbreviation square is used abundantly. Therefore, in this invention, when the heights 2 for printing are squares, the boundary region Y of the above-mentioned heights 2 for printing means the periphery of each square neighborhood.

[0015] Although the range of the boundary region Y of the above-mentioned heights 2 for printing is suitably set up with the magnitude of the plastic plate 1 whole etc., from the periphery edge of the heights 2 for printing, it says the field range of inside about 0.1-several mm, and is usually an inside field about 0.1-1mm preferably. In addition, although it is drawing having shown the top view of the plastic plate 1 typically and the boundary region Y is greatly shown to the central field X of the heights 2 for printing, compared with the central field X, the area of a boundary region Y is very small [(a) of drawing 1 described previously] in fact.

[0016] And the distribution density of the minute projection 3 in the boundary region Y of the above-mentioned heights 2 for printing is set up so that it may become higher than the distribution density of the minute projection 3 of the central field X. the -- a degree -- concrete -- printing -- ** -- heights -- two -- a boundary region -- Y -- minute -- a projection -- three -- distribution density -- (-- Y --) -- printing -- ** -- heights -- two -- a center -- a field -- X -- minute -- a projection -- three -- distribution density -- (-- X --) -- a ratio -- [-- (-- Y --) -- / -- (-- X --) --] -- 1.2 - 2.5 -- becoming -- as -- setting up -- things -- desirable -- especially -- desirable -- $(Y)/(X) = 1.3-2.3$ -- it is . $(Y)/(X)$ namely, less than by 1.2 If the generating prevention effectiveness of a MAJINARU phenomenon becomes scarce and exceeds 2.5 conversely It is because the inclination which the depth (depth from minute projection 3 front face) of the slot 4 holding the coating liquid during the minute projection 3 will not fully be obtained, but the path which misses the coating liquid of the surplus which piled up in the central part of the heights 2 for printing on the heights outside will be severed, and becomes the poor orientation film as a result is seen.

[0017] Furthermore, it is set up so that the rate of occupancy area of the minute projection 3 may become high gradually, as the distribution density of the minute projection 3 goes to the edge in the boundary region Y also in the boundary region Y set up highly. The above "the rate of occupancy area of the minute projection 3 becomes high gradually" means being set up so that the value of the rate of area may become high gradually from the rate of occupancy area of the minute projection 3 near the

central field X of the boundary region Y of the heights 2 for printing to the rate of occupancy area of the minute projection 3 by the side of the edge of a boundary region Y. And it is desirable to set up as a degree which becomes high [the rate of occupancy area], so that the ratio $[(\alpha)/(\beta)]$ of the rate (α) of occupancy area of the minute projection 3 by the side of the edge of the boundary region Y of the heights 2 for printing and the rate (β) of occupancy area of the minute projection 3 near the central field X may be set to 1.1-3.3.

[0018] Moreover, especially the depth of the slot 4 formed in the heights 2 for printing in this invention is not what is limited. Although you may form in the depth of abbreviation regularity on the heights 2 whole surface for printing, it sets to the central field X of the heights 2 for printing, for example. the depth of the slot 4 formed of much minute projections 3 -- abbreviation -- it usually comes out uniformly to be formed [which goes to an edge side near the central field X of a boundary region Y] so that it is alike, and may follow and may become shallow gradually.

[0019] Spacing between the above-mentioned minute projection 3 and especially the depth of a slot 4 are not limited, and are set up suitably. That is, these are suitably set up with the thickness of the orientation film by which printing formation is imprinted and carried out. For example, if the thickness of the orientation film is about 300-1000Å, spacing between minute projection 3 should just be within the limits of about 0.03-0.1mm. Moreover, the depth of a slot 4 should just be within the limits of about 0.002-0.035mm.

[0020] Moreover, generally as for the above-mentioned minute projection 3, the cross-section configuration is formed the shape of a truncated cone, and in the shape of a cylinder. and the diameter of a projection of the minute projection 3 of the boundary region Y of the heights 2 for printing to the diameter of a projection of the minute projection 3 of the central field X of the heights 2 for printing -- the diameter of a projection of the minute projection 3 near the central field X -- 0.3 or more-time less than 1.5 times -- and it is desirable to set it as less than 3.0 times 1.5 or more times in the diameter of a projection of the minute projection 3 by the side of the edge of a boundary region Y. more -- desirable -- the diameter of a projection of the minute projection 3 near the central field X -- 0.9 or more-time less than 1.3 times -- and in the diameter of a projection of the minute projection 3 by the side of the edge of a boundary region Y, they are 1.6 or more-time less than 2.4 times. That is, when the orientation film is printed with a printing machine using a plastic plate 1 by setting up the diameter of a projection of the minute projection 3 in this way, the effectiveness which the whole heights are made to distribute equally comes to be acquired, without coating liquid piling up in the fixed direction with the printing pressure added by rotation of a printing machine printing cylinder.

[0021] And it is desirable that array formation is carried out so that the array pattern of the minute projection 3 formed in the boundary region Y may serve as an include angle of 0-45 degrees to the array pattern of the minute projection 3 formed in the central field X about the array pattern of the minute projection 3 formed in the heights 2 for printing. It is 0-30 degrees in include angle especially preferably.

[0022] The plastic plate for thin film formation of this invention can be manufactured as follows, for example. That is, in the field corresponding to the heights for printing of a plastic plate, the negative film whose fields other than the part corresponding to a slot and the heights for printing (non-printed field) the part corresponding to a minute projection is transparent, and are black is prepared first. And on this negative film, a liquefied photo-setting resin is applied so that it may become fixed thickness, and a liquefied photo-setting resin layer is formed. After the stratification, on the above-mentioned liquefied photo-setting resin layer, after carrying out the laminating of the bright film (base film), an optical exposure is performed through this bright film, the above-mentioned liquefied photo-setting resin is stiffened, and the non-printed section of a plastic plate is produced. Subsequently, while forming the heights for printing of a plastic plate by performing an optical exposure through the above-mentioned negative film, the slot established in these heights for printing by much minute projections and this minute projection is formed. And after washing and removing non-hardening resin, a plastic plate is producible by drying and exposing by optical exposure further (postexposure).

[0023] In addition, as a plastic plate for thin film formation of this invention, that by which the

laminating was carried out in the order of the adhesives layer which is from a base film layer, pressure-sensitive mold adhesives, etc. on an opposite side (rear face) side, a metal plate, or a synthetic-resin plate may be used with the heights forming face for printing of the plastic plate obtained as mentioned above. using the plastic plate of such a configuration -- a cupping phenomenon (phenomenon in which the thickness of the boundary region of the heights for printing of the letterpress material itself is formed more thickly than a central field) -- being generated -- being hard -- a result -- a MAJINARU phenomenon -- it becomes possible to control generating effectively.

[0024] As the above-mentioned liquefied photo-setting resin, conventionally, especially if well-known, it does not limit, and what added the photosensitizer, the thermostabilizer, etc. is used for the partial saturation resin which introduced the partial saturation radical into prepolymers, such as a thing which added the photosensitizer, the thermostabilizer, etc. to an unsaturated polyester resin, polybutadiene, etc. or an acrylic, urethane, epoxy, and polyester. Furthermore, as a photo-setting resin, it is not limited liquefied and a solid-state like the shape of a plate may be shown [above]. Specifically, APR (Asahi Chemical Co., Ltd. make), AFP (Asahi Chemical Co., Ltd. make), TEBISUTA (Teijin, Ltd. make), etc. are raised.

[0025] The pattern of a desired minute projection can be formed in the pattern formation of a characteristic minute projection of the heights for printing in the plastic plate for thin film formation of this invention by adjusting suitably the transparence part corresponding to the minute projection of the above-mentioned negative film, and the black part corresponding to a slot. Such a negative film can be formed and produced to a desired pattern for example, using the imagesetter for film exposure (image processing system) etc.

[0026] Thus, formation of the orientation film which is a thin film using the obtained plastic plate for thin film formation is performed as follows. That is, after applying the coating liquid for orientation film formation to the heights for printing of the above-mentioned plastic plate and making coating liquid hold, the above-mentioned coating liquid is imprinted to a printing hand-ed. And the orientation film of the magnitude corresponding to the heights front face for printing can be formed on the printing hand-ed by making it dry, and removing and calcinating a solvent after a coating liquid imprint.

[0027] Moreover, especially as a printing hand-ed by which the above-mentioned coating liquid is imprinted, it does not limit and a well-known thing, for example, a glass plate, a metallic foil, a metal plate, a plastic sheet, a sheet plastic, a knit fabric, a nonwoven fabric, paper, etc. are raised conventionally. A glass plate, a metallic foil, and a metal plate are preferably used from the point that the imprinted coating liquid is hard to be absorbed especially.

[0028] Below, it combines with the example of a comparison and an example is explained.

[0029]

[Examples 1-10, the examples 1-11 of a comparison] [Production of a plastic plate] The glass plate with a thickness of 10mm was prepared first. Besides, the negative film was laid, and further, on the negative film, the liquefied photo-setting resin (the Asahi Chemical Co., Ltd. make, APR) was applied using the knife coating machine so that it might become fixed thickness. Then, the base film was laid in the above-mentioned liquefied photo-setting resin front face. And after performing an optical exposure through this base film, while forming the heights for printing by performing an optical exposure to the next through the above-mentioned negative film, the slot established in these heights for printing by much minute projections and this minute projection was formed. And after washing and removing non-hardening resin, the plastic plate body was produced by drying and exposing by optical exposure further (postexposure).

[0030] In addition, the negative film used in production of the above-mentioned plastic plate was produced using the imagesetter for film exposure currently used for the common printing machine etc., and the thing of the pattern which can be formed was used so that it might become the rate of occupancy area of the distribution density and a minute projection of a minute projection shown in the following table 1.

[0031] Next the pressure sensitive adhesive with a release paper (polyacrylic ester system adhesives, adhesives thickness of 0.03mm) was used for the heights forming face for printing and opposite side of a

plastic plate body which were acquired by the above-mentioned process, and the aluminum plate with a thickness of 0.15 micrometers was stuck. All these processes were performed under the high room temperature in about 50 degrees C, and produced the plastic plate.

[0032]

[Table 1]

		印刷用凸部中央領域		印刷用凸部周辺領域	
		微小突起の分布密度 * 1	微小突起の占有面積率 (%)	微小突起の分布密度 * 1	微小突起の占有面積率 (%) * 2
実施例	1	3 0 0	4 5	5 0 0	5 5→6 5
	2	3 0 0	4 5	4 0 0	5 5→6 5
	3	5 0 0	6 0	7 0 0	8 0→9 5
	4	3 0 0	4 5	3 6 0	5 5→6 5
	5	3 0 0	4 5	5 7 0	5 5→6 5
	6	5 0 0	6 0	6 0 0	8 0→9 5
	7	5 0 0	6 0	6 5 0	8 0→9 5
	8	5 0 0	6 0	9 5 0	8 0→9 5
	9	4 0 0	5 0	7 0 0	6 0→8 5
	10	4 0 0	5 0	9 0 0	8 5→9 5
比較例	1	3 0 0	4 5	3 0 0	4 5
	2	3 0 0	4 5	3 0 0	1 5
	3	3 0 0	4 5	3 0 0	7 5
	4	3 0 0	4 5	2 0 0	4 5
	5	3 0 0	4 5	2 0 0	7 5
	6	3 0 0	4 5	2 0 0	4 5→1 5
	7	3 0 0	4 5	5 0 0	4 5
	8	3 0 0	4 5	5 0 0	8 0
	9	3 0 0	4 5	4 0 0	8 0
	10	5 0 0	6 0	5 0 0	6 0
	11	5 0 0	6 0	3 0 0	8 0

* 1 : 1インチ (25.4mm) 当たり微小突起数

* 2 : 実施例 1～10 は微小突起の占有面積率が周辺領域の端部に向かうにしたがって徐々に高くなっている。
比較例 6 は微小突起の占有面積率が周辺領域の端部に向かうにしたがって徐々に低くなっている。

[0033] Thus, the thin film was formed by the conventional approach using each obtained plastic plate. That is, as shown in drawing 4, while preparing the printing roll (printing machine printing cylinder) 11 which equipped the front face with the above-mentioned plastic plate 10, the printed matter 13-ed (glass substrate) was laid on the printing stage (surface plate) 12. And it was made into 0.10mm between 0.1mm (the amount of pushing), and the printing roll 11 and the printed matter 13-ed between the nip pressure 14 at the time of performing pattern printing, i.e., an ink roll, and the printing roll 11. In addition, an ink roll 14 and the printing roll 11 maintain less than **0.003mm smooth nature, and printed matter-ed 13 front face is less than **0.050mm in smoothness. In drawing 4, 15 is an ink feeder and 16 is a doctor who writes the surplus ink on an ink roll 14.

[0034] According to the above conditions, the coating liquid held at the above-mentioned plastic plate 10 was imprinted on the glass substrate 13. Subsequently, the thin film layer made of polyimide resin was formed by calcinating the coating liquid imprinted on the glass substrate 13 under the oxidation reduction ambient atmosphere for 500 degree-Cx 30 minutes.

[0035] Thus, the obtained thickness of the edge of the central field and boundary region of a thin film was measured using the ten KORU Japan tabulation side granularity meter (Profiler P-1). It evaluated, while the result was shown in the following table 2. In evaluation, what, as for O, effectiveness remarkable to reduction of a MAJINARU phenomenon was regarded as, the thing as which, as for O, a certain amount of improvement effect was regarded, and x were written as what effectiveness was not regarded as at all paying attention to the edge thickness of the boundary region of a thin film layer.

[0036]

[Table 2]

		薄膜中央領域	薄膜周縁領域の端部	
		膜厚み (Å)	膜厚み (Å)	評 価
実施例	1	600～800	<500	◎
	2	600～800	<700	○
	3	600～800	<700	◎
	4	600～800	<700	○
	5	600～800	<500	◎
	6	600～800	<700	○
	7	600～800	<600	◎
	8	600～800	<600	◎
	9	600～800	<700	○
	10	600～800	<600	◎
比較例	1	600～800	>1000	×
	2	600～800	>1000	×
	3	600～800	>1000	×
	4	600～800	>1000	×
	5	600～800	>1000	×
	6	600～800	>1000	×
	7	600～800	>1000	×
	8	600～800	>1000	×
	9	600～800	>1000	×
	10	600～800	>1400	×
	11	600～800	>1700	×

[0037] From the result of the above-mentioned table 2, the example article was formed so that the thickness of the edge of a thin film boundary region might become below comparable thickness compared with the thickness of a thin film central field altogether, and it was good. especially -- printing -- ** -- heights -- a boundary region -- minute -- a projection -- distribution density -- (-- Y --) -- printing -- ** -- heights -- a center -- a field -- minute -- a projection -- distribution density -- (-- X --) -- a ratio -- [-- (-- Y --) -- / -- (-- X --) --] -- 1.3 - 2.3 -- less than -- becoming -- a thing -- evaluation -- especially -- having excelled . On the other hand, as for the example article of a comparison, the thickness of the edge

of a thin film boundary region was altogether formed thickly compared with the thickness of a thin film central field.

[0038]

[Effect of the Invention] As mentioned above, this invention is the plastic plate for thin film formation formed so that the rate of occupancy area of a minute projection might become high gradually as the boundary region of the above-mentioned heights for printing is formed more highly than a central field while the minute projection which the central field of the heights for printing of a plastic plate adjoins is formed at equal intervals, and the distribution density of a minute projection moreover goes to the edge in a boundary region. For this reason, in the thin film formed using this plastic plate, generating of a MAJINARU phenomenon is controlled and the thing of uniform thickness is obtained.

[0039] and -- printing -- ** -- heights -- a boundary region -- minute -- a projection -- distribution density -- (-- Y --) -- printing -- ** -- heights -- a center -- a field -- minute -- a projection -- distribution density -- (-- X --) -- a ratio -- [-- (-- Y --) -- / -- (-- X --) --] -- specification -- the range -- setting up -- if -- more -- much more -- generating of a MAJINARU phenomenon -- controlling -- the orientation film of uniform thickness -- it can form .

[0040] Moreover, form a minute projection the shape of a truncated cone, and in the shape of a cylinder, and receive the diameter of a projection of a minute projection of the central field of the heights for printing. if it sets up so that the diameter of a projection of the minute projection near the central field and the diameter of a projection of the minute projection by the side of the edge of a boundary region may be alike, respectively, the diameter of a projection of a minute projection of the boundary region of the heights for printing may receive and it may become a specific ratio Generating of a MAJINARU phenomenon can be controlled further and the orientation film of uniform thickness can be formed.

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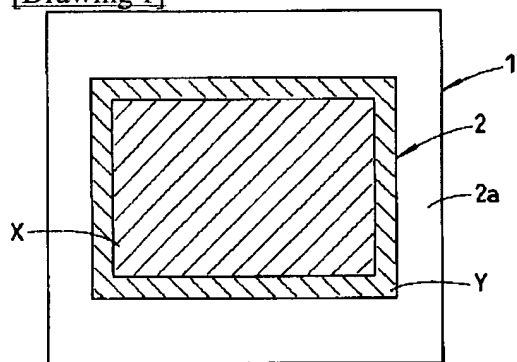
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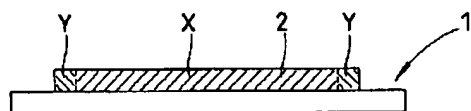
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DRAWINGS

[Drawing 1]



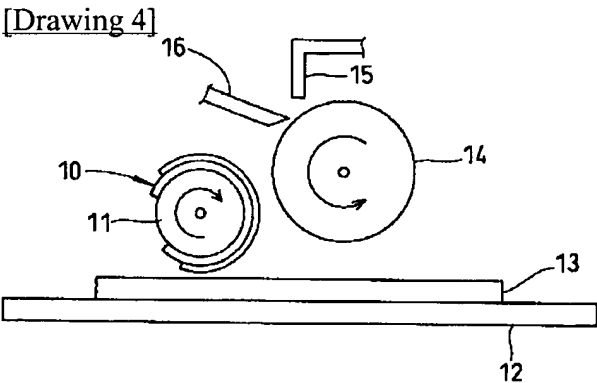
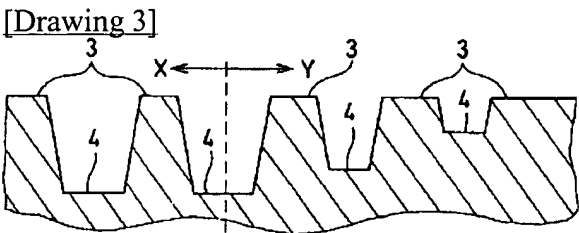
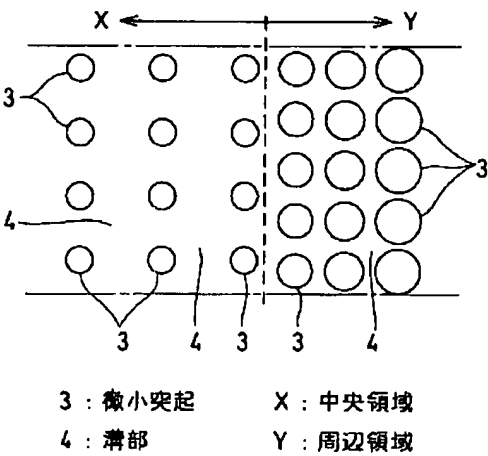
(a)



(b)

1 : 樹脂凸版 X : 中央領域
2 : 印刷用凸部 Y : 周辺領域

[Drawing 2]



[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] (a) is the top view showing typically an example of the plastic plate for thin film formation of this invention, and (b) is the side elevation.

[Drawing 2] It is the top view showing typically a part of plastic plate for thin film formation of this invention.

[Drawing 3] It is the sectional view showing typically a part of plastic plate for thin film formation of this invention.

[Drawing 4] It is the perspective view showing the production process of thin film formation using a plastic plate.

[Description of Notations]

1 Plastic Plate

2 Heights for Printing

3 Minute Projection

4 Slot

X Central field

Y Boundary region

[Translation done.]